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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,153	10/24/2001	D.C. John Ta	21927	3967

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LAUBSCHER SEVERSON
1160 SPA RD
SUITE 2B
ANNAPOLIS, MD 21403

EXAMINER
ABELSON, RONALD B

ART UNIT	PAPER NUMBER
2666	

DATE MAILED: 09/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

		Application No.	Applicant(s)
Office Action Summary		10/036,153	TA ET AL.
		Examiner	**Art Unit**	
		Ronald Abelson	2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>12/30/04 10/5/04 6/21/04 3/30/04 6/9/03</u>. *3/31/03, + 10/24/01*

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-27</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-27</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>24 October 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date <u>12/30/04 10/5/04 6/21/04 3/30/04 6/9/03 , + 3/31/03, ~~...~~</u>

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which

forms the basis for all obviousness rejections set forth in this

Office action:

> (a) A patent may not be obtained though the invention is not identically
> disclosed or described as set forth in section 102 of this title, if the
> differences between the subject matter sought to be patented and the prior
> art are such that the subject matter as a whole would have been obvious at
> the time the invention was made to a person having ordinary skill in the
> art to which said subject matter pertains. Patentability shall not be
> negatived by the manner in which the invention was made.

2.   This application currently names joint inventors. In

considering patentability of the claims under 35 U.S.C. 103(a),

the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered

therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to

point out the inventor and invention dates of each claim that

was not commonly owned at the time a later invention was made in

order for the examiner to consider the applicability of 35

U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior

art under 35 U.S.C. 103(a).

3.   Claim 1, 2, 17, and 22 - 24 are rejected under 35

U.S.C. 103(a) as being unpatentable over Field (US 5,428,616) in

view of Saunders (US 2002/0097463).

Regarding claims 1 and 17, Field teaches a data switch node

(fig. 1 box 1, col. 1 line 66 - col. 2 line 4).

Field teaches a PDU classifier extracting header

information from PDUs received via a plurality of ports (fig. 1

box 1, 2, packet switching node: Note, only one port shown)

associated with the data switching node (fig. 4 elements H, each

incoming packet is processed, header H with a plurality of

information fields, col. 2 lines 33-37).

Field teaches a receive trace record having entries, each

receive trace entry specifying timed information regarding a

corresponding received PDU (fig. 4 element TS, time stamp field

TS, col. 2 lines 33-37, fig. 2 box 12, time stamp field TS

provide an accumulative value of the transmission delay, col. 3

line 31 - col. 4 line 5). The examiner corresponds the

applicant's receive trace entry with the reference's TS value of

the received packet before adding the time the packet was in the

queue.

Field teaches a switching function processing PDUs (fig. 1

box 1, col. 1 line 66 - col. 2 line 4).

Field teaches a transmit trace record having entries, each

transmit trace record specifying timed information regarding a

corresponding processed PDU (measure the time each packet spends

in the queue, col. 3 line 34 - col. 4 line 5).

Note, the examiner corresponds the applicant's receive

trace record with the data structure of Field wherein the timing

information corresponding to the received PDU and transmitted

PDU are stored.

Although Field teaches a processor (fig. 2 box 12), the

reference is silent on using the information stored in the trace

record entries to evaluate the performance of the switching

function.

Saunders teaches using the information stored in the trace

record entries / (time between a packets arrival and departure

at a particular router/switch) to evaluate / measure the

performance of the switching function ([0015], latency is the

delay suffered by a packet during its travel, time packet

arrives at a router until it leaves for the next router/switch

latency). Note, latency is a measure of the performance of the

router/switch.

Therefore it would have been obvious to one of ordinary skill in the art, to modify the system of Field by having the packet controller (Field: fig. 2 box 12) use the measured value of the time each packet is in the queue (Field: col. 3 line 34 - col. 4 line 5) in order to determine the switch latency. This modification can be performed in software. The suggestion for the modification is traffic can be prioritized based upon delay tolerances (Saunders: [0011]). By knowing the latency of each switch, the system would be able to route real-time data based upon the latencies of the switches in the system.

Regarding claim 2, the switching data node comprises a timer (Field: fig. 2 box 14, col. 3 line 34 - col. 4 line 5).

Regarding claim 22, as previously shown, populating a time stamp specifier associated with the receive trace entry with a time value indicative of the time at which the PDU was deemed to be received (Field: fig. 4 element TS, time stamp field TS, col. 2 lines 33-37, fig. 2 box 12, time stamp field TS provide an accumulative value of the transmission delay, col. 3 line 31 - col. 4 line 5).

Regarding claim 23, as previously shown, populating a time
stamp specifier associated with the transmit trace entry with a
time value indicative of the time at which the PDU was deemed to
be processed (Field: measure the time each packet spends in the
queue, col. 3 line 34 – col. 4 line 5).

Regarding claim 24, as previously shown, determining a PDU
processing delay by calculating the difference between time
stamp values held in a receive trace record entry and a transmit
trace record entry corresponding to the PDU (Field, measure the
time each packet spends in the queue, col. 3 line 34 – col. 4
line 5).

4.   Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being
unpatentable over the combination of Field and Saunders as
applied to claim 1 above, and further in view of Berning (US
6,038,619).

Regarding claim 3, although the combination teaches trace
record entries, the combination is silent on each one of the
trace records comprises a circular buffer storing the trace
record entries.

Berning teaches storing entries in a circular buffer

(circular buffer, writing into the buffer, col. 5 lines 30-43).

Regarding claim 4, the combination is silent on each

circular buffers includes an index pointer specifying the next

trace record entry to be populated.

Berning teaches a circular buffer includes an index pointer

specifying the next entry to be populated (associated pointer,

col. 5 lines 30-43).

Therefore it would have been obvious to one of ordinary

skill in the art, to modify the system of the combination of

Field and Saunders by storing the measured time each packet

spends in the queue (Field: col. 3 line 34 - col. 4 line 5) in a

circular buffer that uses a pointer to point to the next queue

location to be written to. This modification can be performed

according to the teachings of Bernings. This modification would

enable the system to store and access the measured time

information.

5.   Claim 5 rejected under 35 U.S.C. 103(a) as being

unpatentable over the combination of Field and Saunders as

applied to claim 1 above, and further in view of Wecker (US
6,289,464).

The combination is silent on the number of trace record
entries associated with each one of the trace records is
prespecified corresponding to a designed PDU processing
throughput of the data switching node.

Wecker teaches the number of number of trace record entries
/ size of memory is proportional to the throughput / rate (fig.
5 box 64, col. 9 lines 43-50). Note the examiner corresponds the
applicant's size of number of trace record entries with the
reference's size of memory. Furthermore, a switches throughput
is proportional to the input data rate.

Therefore it would have been obvious to one of ordinary
skill in the art, to modify the system of the combination of
Field and Saunders by having the size of the trace records /
buffer size proportional to the throughput of the switch. This
modification can be accomplished by setting the buffer size
according to accommodate the input data rate. This would benefit
the system by not wasting memory, yet at the same time providing
sufficient memory for processing the input data.

6.   Claim 6 rejected under 35 U.S.C. 103(a) as being
unpatentable over the combination of Field and Saunders as

applied to claim 1 above, and further in view of Weir (US 5,748,627).

The combination is silent on the number of trace record entries associated with each one of the trace records is variable, the number of entries being adjustable via a one of a manual setting, management console, and a higher level protocol optimizing resources available for a current PDU processing throughput.

Weir teaches the number of trace record entries / buffer length associated with each one of the trace records is variable, the number of entries being adjustable via a one of a manual setting (initially set, buffer length is set, col. 34 lines 28-37). Note, the examiner corresponds the applicant's manual setting with the method of setting the buffer length in Weir.

Therefore it would have been obvious to one of ordinary skill in the art, to modify the system of the combination of Field and Saunders by setting the buffer size dependent upon the data rate. This modification can be performed by using a variable length buffer. This would benefit the system by not wasting memory, yet at the same time providing sufficient memory for processing the input data.

7.   Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being

unpatentable over the combination of Field and Saunders as

applied to claim 1 above, and further in view of Brown (US

6,754,211).

    Regarding claim 7, as previously addressed, the combination

teaches a time value indicative of the time at which the

corresponding PDU was deemed to be received (Field: fig. 4

element TS, time stamp field TS, col. 2 lines 33-37, fig. 2 box

12, time stamp field TS provide an accumulative value of the

transmission delay, col. 3 line 31 – col. 4 line 5).

    The combination is silent on identifying information

corresponding to the received PDU.

    Brown teaches identifying information corresponding to the

received PDU (stores a pointer to the location of the packet in

memory, col. 1 lines 59-61).

    Regarding claim 8, the combination is silent on identifying

information comprises a specific location at which the PDU is

stored pending processing.

    Brown teaches identifying information comprises a specific

location at which the PDU is stored pending processing (stores a

pointer to the location of the packet in memory, col. 1 lines
59-61).

Therefore it would have been obvious to one of ordinary
skill in the art, to modify the system of the combination of
Field and Saunders by incorporating within each trace record a
pointer to the location of each packet. This modification can be
performed according to the teachings of Brown. This would
benefit the system by providing the packet controller (Field:
fig. 2 box 12) with a means for accessing each individual
packet.

8.   Claim 9 rejected under 35 U.S.C. 103(a) as being
unpatentable over the combination of Field, Saunders, and Brown
as applied to claim 7 above, and further in view of Abu-Amara
(US 5,870,396).

The combination is silent on identifying information
corresponding to the received PDU comprises a specification of a
port via which the PDU was received.

Abu-Amara teaches identifying information corresponding to
the received PDU comprises a specification of a port via which
the PDU was received (second subqueue to store the input port

number at which a data packet was received, col. 21 lines 54-59).

Therefore it would have been obvious to one of ordinary skill in the art, to modify the system of the combination of Field, Saunders, and Brown to store the input port number of each received packet. This modification can be performed according to the teachings of Brown.   This modification would benefit the system by providing a method for the system to know which input port the data packet came in on. This would be useful for the system if the switch has to send a message to the packet source.

9.   Claim 10 rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Field, Saunders, and Brown as applied to claim 7 above, and further in view of Lin (US 4,937,817).

The combination is silent on a specification of a destination context corresponding to the received PDU.

Lin teaches a specification of a destination context / address corresponding to the received PDU (fig. 2 box 108, 126, storing the destination address of a packet in buffer, col. 6 lines 46-50).

Therefore it would have been obvious to one of ordinary
skill in the art, to modify the system of the combination of
Field, Saunders, and Brown by storing the destination address of
the received packet. This modification can be performed
according to the teachings of Lin. This modification would
benefit the system by providing a method for informing the
system of the destination address of each packet that is to be
output.

10.   Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as
being unpatentable over the combination of Field and Saunders as
applied to claim 1 above, and further in view of Brown (US
6,754,211).

Regarding claim 11, as previously addressed, the
combination teaches a time value indicative of the time at which
the corresponding PDU was deemed to been processed (Field:
measure the time each packet spends in the queue, col. 3 line 34
- col. 4 line 5).

The combination is silent on identifying information
corresponding to the PDU.

Brown teaches identifying information corresponding to the
processed PDU (pointer to the location of the packet in memory,
col. 1 lines 59-61).

Regarding claim 12, the combination is silent on
identifying information comprises a specific location at which
the PDU is stored pending processing.

Brown teaches identifying information comprises a specific
location at which the PDU is stored pending processing (pointer
to the location of the packet in memory, col. 1 lines 59-61).

Therefore it would have been obvious to one of ordinary
skill in the art, to modify the system of the combination of
Field and Saunders by incorporating within each trace record a
pointer to the location of each packet. This modification can be
performed according to the teachings of Brown. This would
benefit the system by providing the packet controller (Field:
fig. 2 box 12) with a means for accessing each individual
packet.

11.   Claim 13 rejected under 35 U.S.C. 103(a) as being
unpatentable over the combination of Field, Saunders, and Brown
as applied to claim 11 above, and further in view of Abu-Amara
(US 5,870,396).

The combination is silent on identifying information corresponding to the received PDU comprises a specification of a port via which the PDU was received.

Abu-Amara teaches identifying information corresponding to the received PDU comprises a specification of a port via which the PDU was received (second subqueue to store the input port number at which a data packet was received, col. 21 lines 54-59).

Therefore it would have been obvious to one of ordinary skill in the art, to modify the system of the combination of Field, Saunders, and Brown to store the input port number of each received packet. This modification can be performed according to the teachings of Brown. This modification would benefit the system by providing a method for the system to know which input port the data packet came in on. This would be useful for the system if the switch has to send a message to the packet source.

12. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Field, Saunders, and Brown as applied to claim 11 above, and further in view of Lin (US 4,937,817).

Regarding claim 14, the combination is silent on a

specification of a destination context corresponding to the

received PDU.

Lin teaches a specification of a destination context

corresponding to the received PDU (fig. 2 box 108, 126, storing

the destination address of a packet in buffer, col. 6 lines 46-

50).

Regarding claim 15, the combination is silent on

destination context corresponding to the processed PDU includes

a port via which the PDU is to be forwarded towards an intended

destination.

Lin teaches a destination context corresponding to the

processed PDU includes a port / destination address via which

the PDU is to be forwarded towards an intended destination (fig.

1 box 109, 103, destination address representing an output port

103, col. 4 lines 22-27). Note, Lin shows the correspondence

between the destination address and output port.

Therefore it would have been obvious to one of ordinary

skill in the art, to modify the system of the combination of

Field, Saunders, and Brown by storing the destination address of

the received packet. This modification can be performed

according to the teachings of Linn. This modification would

benefit the system by providing a method for informing the

system of the destination address of each packet that is to be

output.

13.   Claim 16 rejected under 35 U.S.C. 103(a) as being

unpatentable over the combination of Field, Saunders, Brown, and

Lin as applied to claim 14 above, and further in view of

Jacobson (US 6,934,256).

Regarding claim 16, the combination is silent on

specification of the destination context corresponding to the

processed PDU includes a specification that the PDU is to be

dropped.

Jacobson teaches specification that the PDU is to be

dropped (dropped packet record, col. 13 lines 31-38).

Therefore it would have been obvious to one of ordinary

skill in the art, to modify the system of the combination of

Field and Saunders by determining if each packet should be and

recording whether the packet was dropped or not. This

modification can be performed according to the algorithm of

Jacobson. The suggestion for the modification is to perform

congestion control (Jacobson: col. 13 lines 31-38).

14.   Claim 18 rejected under 35 U.S.C. 103(a) as being

unpatentable over the combination of Field and Saunders as

applied to claim 17 above, and further in view of Brown.

The combination is silent on a PDU pointer entry with a

value indicative of a location at which the corresponding PDU is

temporarily stored.

Brown teaches a PDU pointer entry with a value indicative

of a location at which the corresponding PDU is temporarily

stored (pointer to the location of the packet in memory, col. 1

lines 59-61).

Therefore it would have been obvious to one of ordinary

skill in the art, to modify the combination of Field and

Saunders system of by incorporating within each trace record a

pointer to the location of each packet. This modification can be

performed according to the teachings of Brown. This would

benefit the system by providing the packet controller (Field:

fig. 2 box 12) with a means for accessing each individual

packet.

15.   Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as
being unpatentable over the combination of Field and Saunders as
applied to claim 17 above, and further in view of Jacobson (US
6,934,256).

Regarding claim 19, the combination is silent on populating
one of the trace record with information indicating of a PDU
discard in the case of a PDU drop instance.

Jacobson teaches recording information indicating of a PDU
discard in the case of a PDU drop instance (dropped packet
record, col. 13 lines 31-38).

Regarding claim 20, the combination is silent on
calculating a PDU drop indication corresponding to each stream
of data conveyed by the data switching node.

Jacobson teaches calculating a PDU drop indication
corresponding to each stream of data conveyed (algorithm drops
packets to control the queue, based on statistical properties,
col. 13 lines 31-38).

Regarding claim 21, the combination is silent on
calculating a PDU drop indication corresponding to a current
operational state of the data switching node.

Jacobson teaches calculating a PDU drop indication
(algorithm drops packets to control the queue, based on
statistical properties, col. 13 lines 31-38). Note, as
previously addressed, the combination of Field and Saunders
teaches evaluating / measuring the performance of the data
switching node corresponding to a current operational state /
latency (Saunders: [0015], latency is the delay suffered by a
packet during its travel, time packet arrives at a router until
it leaves for the next router/switch latency).

Therefore it would have been obvious to one of ordinary
skill in the art, to modify the system of the combination of
Field and Saunders by determining if each packet should be
dropped and recording whether the packet was dropped or not.
This modification can be performed according to the algorithm of
Jacobson. The suggestion for the modification is to perform
congestion control (Jacobson: col. 13 lines 31-38).

16.   Claim 25 rejected under 35 U.S.C. 103(a) as being
unpatentable over the combination of Field and Saunders as
applied to claim 23 above, and further in view of Bare (US
6,577,600).

Although the combination teaches determining a PDU processing delay / latency, the combination is silent on determining an average PDU processing delay incurred at the data switching node by calculating an average of the PDU processing delays incurred by corresponding PDUs.

Bare teaches determining an average PDU processing delay incurred at the data switching node by calculating an average of the PDU processing delays incurred by corresponding PDUs (latency, weighted average, col. 6 lines 41-45).

Therefore it would have been obvious to one of ordinary skill in the art, to modify the system of the combination of Field and Saunders by calculating an average latency. This modification can be performed by averaging the latencies of several consecutive processed PDUs. This would benefit the system by providing a better indication of the expected latency associated with the switch.

17. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Field and Saunders as applied to claim 23 above, and further in view of Li (US 6,567,408).

Regarding claims 26, although the combination determining a
PDU processing delay for at a particular switch, the combination
is silent on determining a PDU conveyance jitter / jitter for a
stream of data by determining the distribution of PDU processing
delays incurred by a plurality of PDUs associated with a stream
of data.

Regarding claim 26, Li teaches determining a PDU conveyance
jitter / jitter for a stream of data by determining the
distribution of PDU processing delays incurred by a plurality of
PDUs associated with a stream of data (jitter- a measure of
variation in the delay, width of the distribution function,
probability that packet will experience a particular delay, col.
3 lines 4-14).

Regarding claims 27, although the combination teaches
determining a PDU processing delay for at a particular switch,
the combination is silent on determining a PDU conveyance jitter
/ jitter for the data switching node by determining the
distribution of PDU processing delays incurred by a plurality of
PDUs forwarded by the data switching node.

Regarding claim 27, Li teaches determining a PDU conveyance
jitter / jitter by determining the distribution of PDU
processing delays incurred by a plurality of PDUs associated

with a stream of data (jitter- a measure of variation in the delay, width of the distribution function, probability that packet will experience a particular delay, col. 3 lines 4-14).

Therefore it would have been obvious to one of ordinary skill in the art, to modify the system of the combination of Field and Saunders by calculating the jitter based on a plurality of delays associated with the processed PDUs at each switch. This modification can be performed according to common algorithms for calculating jitter. The suggestion for the modification is different applications require different levels of QoS / jitter (Li: col. 3 lines 13-14). A jitter calculation for each switch would benefit the system by providing the system with information for routing based upon the jitter at each switch.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald Abelson whose telephone number is (571) 272-3165. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (571) 272-3174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ronald Abelson
Examiner
Art Unit 2666

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